REMARKS

Reconsideration of the pending application is respectfully requested in view of the foregoing amendments and the following remarks.

Status of the Application

Claims 1-11, 14-25, 28-37 and 40 are currently pending. In this response, claims 12, 13, 26, 27, 38, and 39 are withdrawn from consideration, claim 1 is amended, and claims 14, 16-25 and 40 are cancelled without prejudice.

Summary of the Office Action

This Office Action examines the claims of Group I, elected with traverse. The specification is objected to on various grounds. Claims 1, 2-7, and 8-9 are also objected to on various grounds. Claims 1-11, 14 and 16-25 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Claims 8, 9, 22, 23, 34 and 35 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Claims 1-6, 14-20, 28-32 and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,872,870 to Michael (hereinafter "Michael") in view of Y. Kawata et al., *Curvature Based Characterization of Shape and Internal Intensity Structure for Classification of Pulmonary Nodules Using Thin-Section CT Images*, SPIE Conference on Image Processing, Vol. 3661, pp. 541-552, February 1999 (hereinafter "Kawata"). Claims 7, 21, and 33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Michael in view of Kawata and in further view of R. Desai and H.D. Cheng, *Pattern Recognition by Local Radial Moments, Pattern Recognition*, Computer Vision & Image Processing, Proceedings of the 12th IAPR International Conference, Vol. 2, pp. 168-72, 9-13 Oct. 1994 (hereinafter "Desai"). Claims 10, 24 and 36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Michael in view of Kawata and in further view of Dewaele et al., *A Trainable Rule-Based Network for Irradiation Field Recognition in AGFA's ADC System*, Proc. of SPIE, Vol. 2708, Medical Imaging: Physics of Medical Imaging, pp. 72-84, April 1996 (hereinafter "Dewaele"). Claims 11, 25, and 37 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Michaeil in view of Kawata and in further view of EP1256907 to P. Dewaele (hereinafter "the '907 reference").

Discussion

35 U.S.C. § 103(a) Rejections

The subject matter of the present application pertains generally to computer implemented ways of detecting an orientation of a digital representation of a radiographic image, whereby the decision on the orientation of the digital representation is based on an extreme value (e.g, maximum or minimum) of the calculated moments of the digital image. *See* Application, page 3, Abstract. To this end, claim 1 recites "obtaining … a decision on the orientation of said radiographic image on the basis of an extreme value … of the calculated moments." Claim 1 is reproduced below for Examiner's reference.

> 1. A method of detecting the orientation of a radiographic image represented by a digital signal representation comprising:
> calculating, via a medical computer system, mathematical moments of said digital signal representation relative to different reference entities; and
> obtaining, via the medical computer system, a decision on the orientation of said radiographic image on the basis of an extreme value comprising one of a maximum and a minimum of the calculated moments.

Hence, the orientation of the image is obtained based on calculating an extreme value of the mathematical moments of the digital representation of the image. *Id.*

By contrast, Michael is directed to determining extreme points of the *object* under evaluation, rather than extreme values of the *moments* relative to different reference entities to determine orientation of the object, as in claim 1. As illustrated in Figure 2 of Michael, the extreme points of the object 22 are shown via reference numerals 34 (a, b, c, and d) and 38 (a, b, c, and d). These points represent the extreme values of the object 22 itself and not a maximum or minimum value of the calculated moments of the image representation. Notably, Michael relies on moment calculation to determine the orientation of a local coordinate sytem relative to which the *extreme values of the object* itself are calculated, as opposed to calculating extreme values of the moments and determining the orientation of the object based on such values. *See* Michael, col. 4, line 3 ("The method of the invention permits *identification of object extremes* with respect to reference frames") (emphasis added).

Kuwata likewise does not determine maximum or minimum values of the object's mathematical moments, and therefore does not cure the foregoing deficiencies of Michael.

Therefore, neither Michael nor Kuwata, teach or suggest "obtaining … a decision on the orientation of said radiographic image on the basis of an extreme value … of the calculated moments," as recited in claim 1.

Dependent claims 2-11, 15, and 28-37 incorporate all of the requirements of the independent claim 1 and, therefore, are also patentable for at least the same reasons.

35 U.S.C. § 101 Rejections

Claims 1-11, 14, and 16-25 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. As amended, independent claim 1 clarifies that "a medical computer system" is performing the recited steps. *See* Application, page 2 (describing "medical viewing stations" and a "computer display or viewing station" for viewing digital mammography); *see also* Figure 1 (describing image input and acquisition via a "PACS" system known to those skilled in the art as Picture Archiving and Communication System, which includes special purpose medical imaging, computer, and network hardware for processing medical images). Therefore, Applicants submit that claim 1, as amended, ties the recited steps to a particular machine, as required by Federal Circuit precedent. *See generally In re Bilski*, 545 F.3d 943, 88 U.S.P.Q.2d 1385 (Fed. Cir. 2008). Therefore, Applicants believe that claim 1 meets the patentable subject matter requirements of 35 U.S.C. § 101. Dependent claims 2-11 incorporate all of the requirements of the independent claim 1 and, therefore, also meet the patentable subject matter requirements of 35 U.S.C. § 101 for at least the same reasons. Furthermore, Applicants note that dependent claims 14 and 16-25 have been cancelled without prejudice, thereby rendering moot their rejection under 35 U.S.C. § 101.

35 U.S.C. § 112 Rejections, Specification and Claim Objections

With respect to the objections to the specification on page 3 of the Office Action, the definitions of moments have been corrected throughout the specification, in accordance with the Examiner's suggestions. Likewise, corrections have been made to page 11, line 20[1] and page 13, line 16 in accordance with the Examiner's suggestions.

[1] The Applicants note that while the Examiner is referring to page 10, line 20 for the occurrence of the term "integration," this term appears only on page 11, line 20 of the specification.

With respect to Examiner's objection to page 11, line 4 of the specification as referring to a derivative of a discrete function, Applicants respectfully note that the term "derivative" is commonly used in the field of digital image processing in connection with discrete functions. Specifically, one skilled in the art will understand the term "derivative" in this context to refer to discrete differentiation using finite differences. Therefore, Applicants respectfully submit that a correction to page 11, line 4 of the specification is not required.

Claim 1 has been amended to address the Examiner's objection to the parenthetical use of the term "maximum, minimum."

Claims 2-7 are objected to under 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Initially, Applicants respectfully disagree with the Examiner's interpretation of claim 1 as being limited to two-dimensional images and moments. Three-dimensional images, for instance, also are possible. Additionally, as the Office Action itself notes, a polar coordinate system may be among other two-dimensional embodiments. Therefore, a cartesian moment of claim 2 is a specific embodiment that does further limit claim 1. Likewise, with respect to claim 3, Applicants turn the Examiner's attention to the fact that this claim recites "the axes [of the cartesian coordinate system being] substantially parallel to the boundaries of said image," which further limits claim 2. In the embodiment of claim 3, the fact that the axes are substantially parallel to the boundaries of the image further assists in determining its orientation. As discussed above with respect to claims 2 and 3, claim 1 is not limited to two-dimensional moments, therefore "two-dimensional moments" of claim 4 further limits claim 1, contrary to the Office Action's assertion.

With respect to objections to claims 5-7, these claims further specify the particular types of "reference entities" recited in claim 1, such as a "predefined axis" (claim 5), the axis being "parallel to one of the boundaries of said image" (claim 6), and "a predefined point" (claim 7). As claim 1 is not limited to these particular "reference entities," these claims further limit the claim(s) from which they depend.

The Office Action objects to claims 8 and 9 as being directed to various derivatives of digital signals. According to the Office Action, digital signals do not have derivatives. As discussed above, Applicants respectfully note that the term "derivative" is commonly used in the field of digital image processing in connection with discrete functions and one skilled in the art would understand the term "derivative" in this context to refer to discrete

differentiation using finite differences. Based on the foregoing, Applicants submit that the objections to claims 8 and 9 are moot.

Likewise, with respect to 35 U.S.C. § 112, first paragraph, rejection of claims 8-9, 22-23 and 34-35 as being directed to non-differentiable digital signals and, therefore, not being enabled, Applicants respectfully refer the Examiner to the foregoing explanation of the meaning of the term "derivative" to those skilled in the art and in the context of digital signal processing. Therefore, Applicants submit that the context of the term "derivative" in the art with respect to digital representations of a signal renders these claims enabled.[2]

Conclusion

As Applicants believe the application is in proper condition for allowance, the examiner is respectfully requested to pass the application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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[2] The Applicants further note that claims 22-23 have been cancelled without prejudice.